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METHOD FOR THE MANUFACTURE OF HOUSING AND ADJUSTING PARTS
CONSISTING OF METAL

A known control part presents aluminum rings which are not suited for the arrangement of symbols with so-called islands.

A method is therefore proposed, which comprises the following process steps:

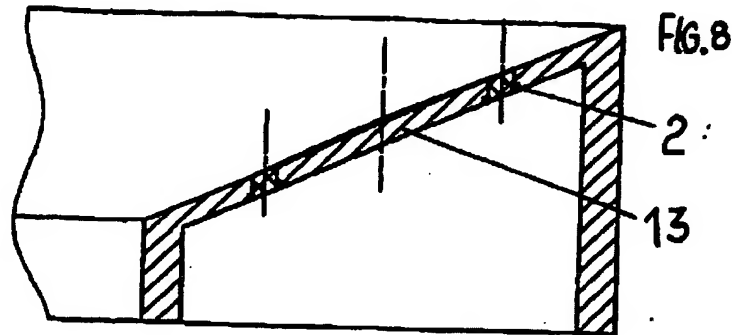
Manufacture of a housing or adjusting part (1, 3) as a forged or cast blank (4, 5),

Creation of a recess (6) for the display insert by means of a die in a punch device with ejection (7) of a wall surface (8) located on the back side in the punch direction,

Contraction of the recess (6) by means of a wedge-peeling deformation of the delimitation walls (9) of the recess (6),

Injection of the transparent plastic (2) into the recess (6) and optionally in a mold which is connected with the recess (6) for the formation of a collar (10) on a wall surface (11) which is on the front side in the punch direction,

Ablation of the back side wall surface (8) with the ejection (7) by a fixed thickness amount (12), resulting in the clearance of the recess (6) or of the transparent plastic (2).



Description

[0001]

The invention relates to a method for the manufacture of housing and adjusting parts made of metal, which present a display insert consisting of transparent plastic, according to the preamble of Claim 1.

[0002]

These housing or adjusting parts made of metal, compared to those made of plastic, improve the appearance and the suitability for monitoring different operation devices in vehicles, for example, navigational heating regulation systems, lighting devices, etc.

[0003]

A corresponding example can be obtained from ATZ-Automobiltechnische Zeitschrift, December issue 1998, No. 12, page 879. Here it is already indicated that the design plays an important role in the development of an air conditioning regulation system. In the system described here, a forged aluminum ring is placed in the back of each one of the two rotary switches for the temperature setting, and a light conductor for night operation is integrated in the ring.

[0004]

In the figure of a control part shown here, with the aluminum rings located in the back, one can, on the one hand, recognize the light conductors which are integrated as symbols, however, there are also additional symbols which are arranged on push-buttons. Compared to the symbols of the rings, the push-buttons clearly also present so called islands within the symbols, which are not transparent.

[0005]

The islands are the reason why these symbols are not arranged in housing or adjusting parts made of metal, because the islands would fall out during the manufacture of the recesses to be filled with transparent plastic.

[0006]

Based on the above, the problem of the invention is to find process steps for a method for the manufacture of housing or adjusting parts made of metal which also allow the use of symbols with islands.

[0007]

This problem is solved by the process steps mentioned in Claim 1. Advantageous additional measures are indicated in the secondary claims.

[0008]

The method according to the invention is described below in connection with the manufacture of an aluminum ring and a push-button switch represented in the drawing.

[0009]

The drawing shows:

Figures 1 and 2:

an aluminum ring in top view and in cross section,

Figures 3-8:

detail enlargements of Figure 2 in the embodiments according to the process steps,

Figure 9:

a view of a push-button switch with symbols presenting islands.

[0010]

Figure 1 shows a view of an aluminum ring 1, which is located, as a part of a fixed control part housing, in the back of a rotary switch. The control part itself can be installed in a vehicle.

[0011]

The aluminum ring 1 is fitted with a display insert made of transparent plastic 2, which is designed to function as a night display. This aluminum ring 1, like the push-button switch 3 represented in Figure 9, can also be manufactured, by a method to manufacture housing or adjusting parts made of metal, which are fitted with a display insert made of transparent plastic, where the following process steps are provided:

Manufacture of a housing or adjusting part 1, 3 as a forged or cast blank 4, 5,

Formation of a recess 6 for the display insert by means of a die in a punch device with ejection 7 of a wall surface 8 located on the back side in the punch direction, as represented in Figure 3,

Contraction of the recess 6 by means of a wedge-peeling deformation of the delimitation walls 9 of the recess 6, for the purpose of later holding the display insert within the recess 6,

Injection of the transparent plastic 2 into the recess 6 and optionally in a mold which is connected with a recess 6 for the formation of a collar 10 on a wall surface 11 which is on the front side in the punch direction; this results in an additional holding of the plastic 2 or of the display insert in the housing or adjusting part 1 or 3,

Ablation of the back side wall surface 8 with the ejection 7 by a fixed thickness amount 12, resulting in the uncovering of the recess 6 or of the transparent plastic 2; this means that the formation of the recess 6 was carried out with reduction by the thickness amount 12, the wall in

this thickness amount holds the islands 13 of the symbols during the injection in its predetermined position.

[0012]

It is advantageous, if an additional process step is carried out, later to provide surface covers for the wall surface 8 which is uncovered by ablation, which can be achieved by the production of an eloxal layer, if the housing or adjusting parts 1, 3 are made of aluminum or an Al containing alloy, where the eloxation is carried out with electrical contacting also applied to each one of the islands 13 which have been electrically separated by ablation.

[0013]

A mechanical ablation, for example, by turning or milling, of the thickness amount 12, or a mechanical ablation of the ejection, followed by the uncovering of the recess 6 or of the transparent plastic 2 by laser ablation, are carried out.

[0014]

It may be necessary to carry out an ablation of the collar 10 on the front-side wall surface 11, in an additional process step, to achieve a greater transparency of the display insert.

[0015]

The machining of the push-button switch 3 represented in Figure 9 is advantageously carried out like that of the aluminum ring 1.

[0016]

The aluminum ring 1 or the push-button switch 3 can be colored by the generation of the eloxal layer.

[0017]

Naturally, the housing part 1 with the plastic insert can also be used for decorative purposes only, that is to surround an air outlet.

Claims

1. Method for the manufacture of metal housing or adjusting parts which are fitted with a display insert made of transparent plastic, characterized by the following process steps:

manufacture of a housing or adjusting part (1, 3) as a forged or cast blank (4, 5),
formation of a recess (6) for the display insert by means of a die in a punch device with ejection (7) of a wall surface (8) located on the back side in the punch direction,
contraction of the recess (6) by means of a wedge-peeling deformation of the delimitation walls (9) of the recess (6),

injection of the transparent plastic (2) into the recess (6) and optionally in a mold which is connected with the recess (6) for the formation of a collar (10) on a wall surface (11) which is on the front side in the punch direction,

ablation of the back side wall surface (8) with the ejection (7) by a fixed thickness amount (12), resulting in the uncovering of the recess (6) or of the transparent plastic (2).

2. Method according to Claim 1, characterized by surface covers of the wall surface (8) which is uncovered by ablation.

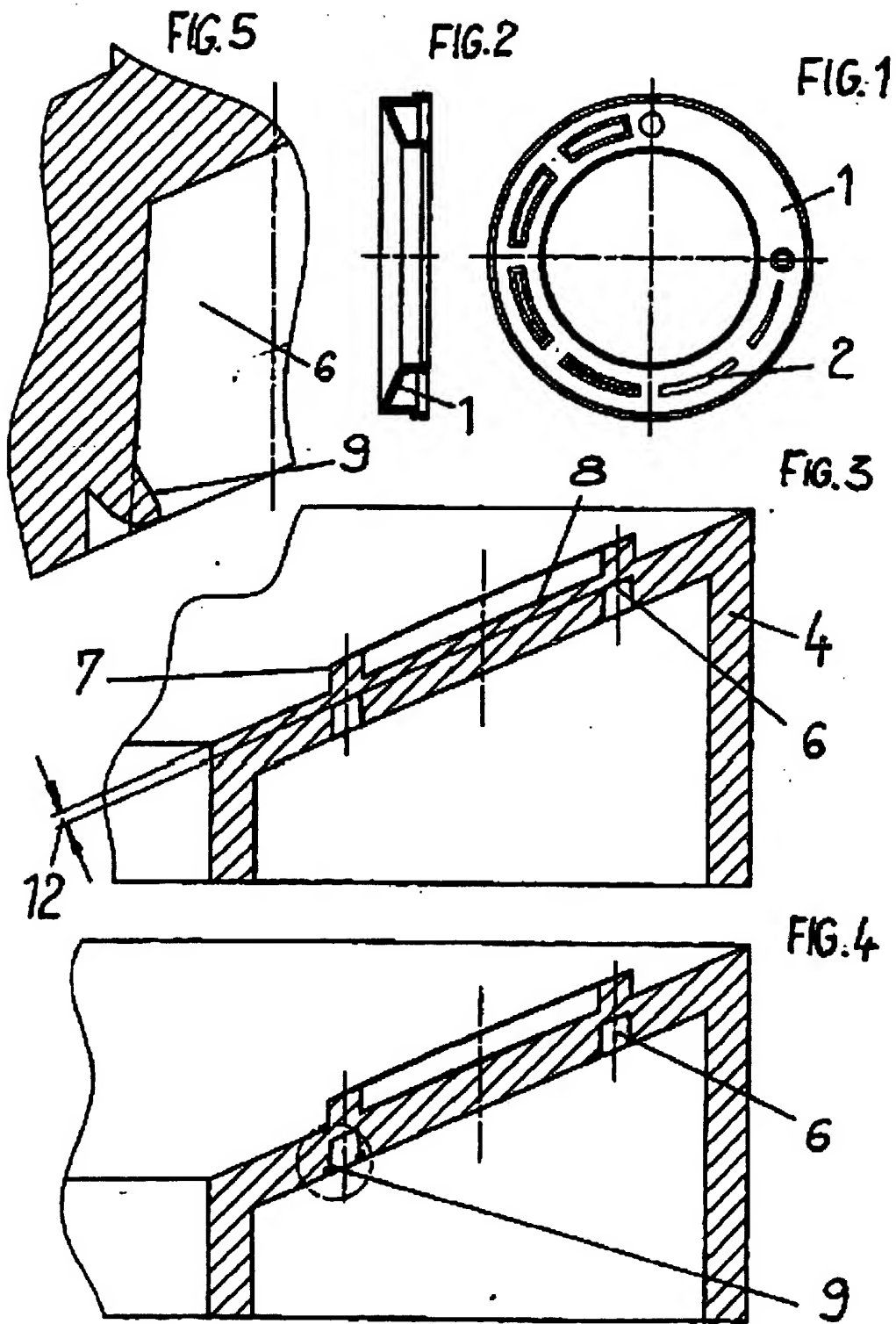
3. Method according to Claim 2, characterized by surface covers by the generation of an eloxal layer, if the housing or adjusting parts (1, 3) are made of aluminum or an Al containing alloy, where the eloxation is carried out with electrical contacting of each one of the islands (13) which have been separated electrically by ablation, within the display inserts.

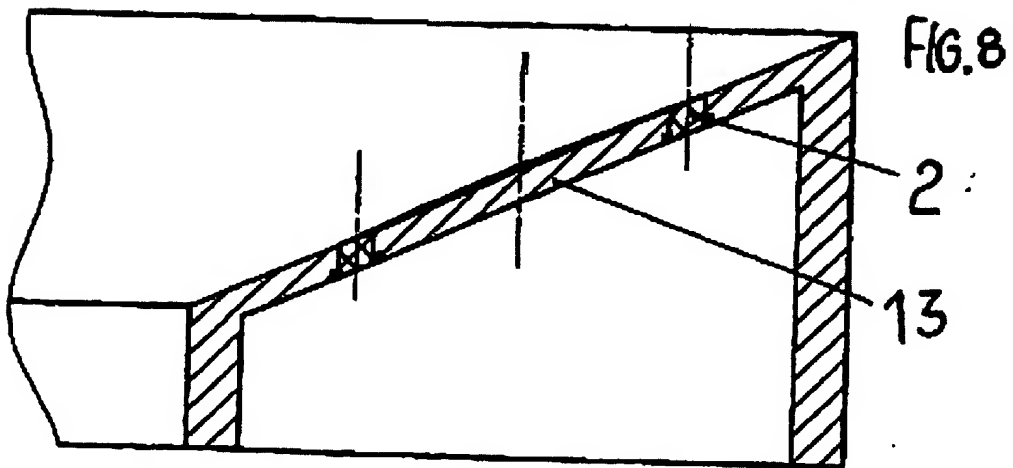
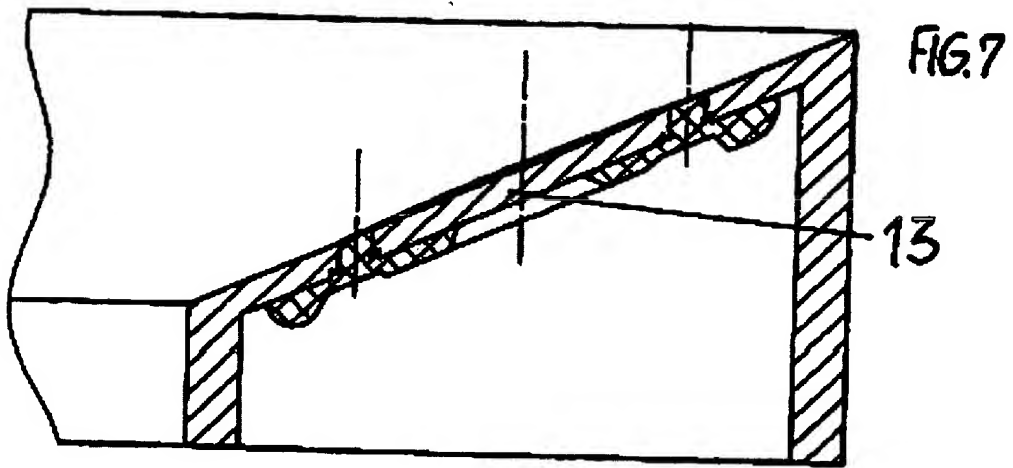
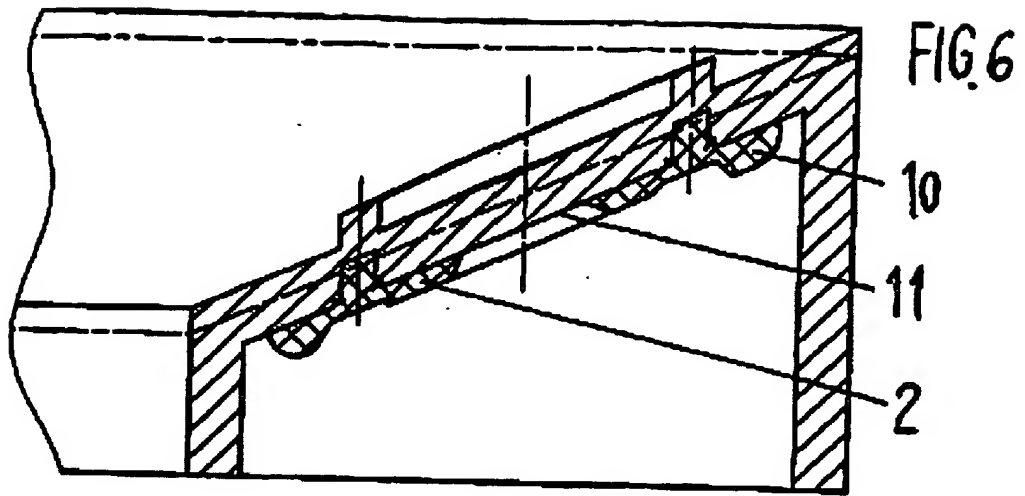
4. Method according to one of Claims 1-3, characterized by a mechanical ablation.

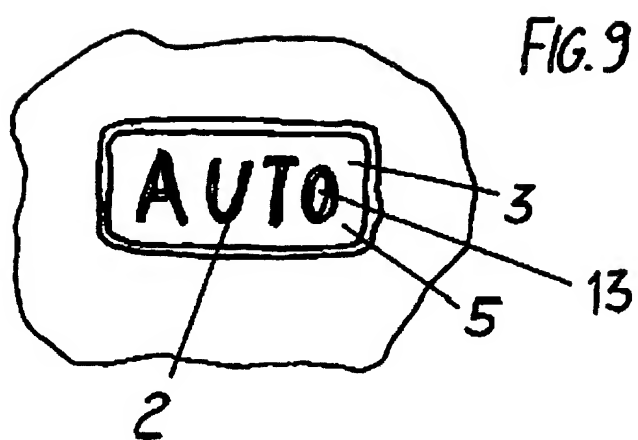
5. Method according to one of Claims 1-3, characterized by a mechanical ablation with subsequent uncovering of the recess (6) or of the transparent plastic (2) by laser ablation.

6. Method according to one of Claims 1-5, characterized by ablation of the collar (10) on the front-side wall surface (11).

7. Method according to one of Claims 3-6, characterized by coloring of the eloxal layer.







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| DOCUMENTS CONSIDERED TO BE RELEVANT | | | | | | | | | | | | | |
|--|---|---|--|--|--|--|---|------------------------------|---------------------------------------|----------------------------|--------------------------------------|---------------------------|--|
| Category | Citation of document with indication where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (Int Cl ⁷) | | | | | | | | | | |
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| | | | TECHNICAL FIELDS SEARCHED (Int. Cl. ⁷) | | | | | | | | | | |
| | | | B29C B44C | | | | | | | | | | |
| The present search report has been drawn up for all claims. | | | | | | | | | | | | | |
| Place of search THE HAGUE | | Date of completion of the search June 27, 2000 | Examiner Bollen, J | | | | | | | | | | |
| <p align="center">CATEGORY OF CITED DOCUMENTS</p> <table border="0"> <tr> <td>X: Particularly relevant if taken alone.</td> <td>T: Theory or principle underlying the invention.</td> </tr> <tr> <td>Y: Particularly relevant if combined with another document of the same category.</td> <td>E: Earlier patent document, but published on, or after the filing date.</td> </tr> <tr> <td>A: Technological background.</td> <td>D: Document cited in the application.</td> </tr> <tr> <td>O: Non-written disclosure.</td> <td>L: Document cited for other reasons.</td> </tr> <tr> <td>P: Intermediate document.</td> <td>&: Member of the same patent family, corresponding document.</td> </tr> </table> | | | | X: Particularly relevant if taken alone. | T: Theory or principle underlying the invention. | Y: Particularly relevant if combined with another document of the same category. | E: Earlier patent document, but published on, or after the filing date. | A: Technological background. | D: Document cited in the application. | O: Non-written disclosure. | L: Document cited for other reasons. | P: Intermediate document. | &: Member of the same patent family, corresponding document. |
| X: Particularly relevant if taken alone. | T: Theory or principle underlying the invention. | | | | | | | | | | | | |
| Y: Particularly relevant if combined with another document of the same category. | E: Earlier patent document, but published on, or after the filing date. | | | | | | | | | | | | |
| A: Technological background. | D: Document cited in the application. | | | | | | | | | | | | |
| O: Non-written disclosure. | L: Document cited for other reasons. | | | | | | | | | | | | |
| P: Intermediate document. | &: Member of the same patent family, corresponding document. | | | | | | | | | | | | |

APPENDIX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN
PATENT APPLICATION NO.

EP 00 10 4683

In this appendix, the patent family members of patent documents listed in the above-referenced European Search Report are indicated.

The data on the family members correspond to the state of the files of the European Patent Office on June 27, 2000
These data serve only for information and are given without guarantee

| Patent document listed in the search report | Date of publication | Member(s) of the patent family | Date of publication |
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For additional details regarding this Appendix: see Official Journal of the European Patent Office No. 12/82